Patent Claims

1. A magnetic linear drive, in particular for an electrical switch, having a coil (10, 11) through which a current can be passed and in whose interior the current can produce a magnetic flux (13) in an axial direction (34), having an armature (1) which can move only at right angles to the axial direction (34) and which has a magnetically active part (3) whose movement path passes through an airgap (7) within a core (14, 15) which passes through the coil (10, 11), or passes one end face of the core (14, 15), with the magnetically active part (3) being demagnetized or magnetized in such a manner that the magnetic flux (17) runs parallel to the axial direction (34), or parallel to it but in the opposite direction, within the magnetically active part (3),
characterized in that
the magnetically active part can be positioned permanently in two limit positions, and can be moved from a first limit position to a second limit position by the influence of a current.

2. The magnetic linear drive as claimed in claim 1,
characterized in that
the magnetically active part (3) is magnetized, and in that, in at least one limit position of the magnetically active part (3), this part (3) is arranged at least partially in the region of a yoke body (8) which is arranged outside the coil, such that the magnetic flux (17) emerging from the magnetically active part (3), or entering it, passes at least partially directly through a boundary surface (35) of the yoke body facing the magnetically active part.

3. The magnetic linear drive as claimed in one of claims 1 or 2,
characterized in that
a second coil (11) is located opposite the coil (10) with respect to the movement path of the magnetically active part (3) and, together with the first coil (10), a current can be passed through it in the same direction sense as the first coil (10).

4. The magnetic linear drive as claimed in claim 1, 2 or 3,
characterized in that
the first coil (10) and the second coil (11) are offset with respect to one another in the movement direction of the armature (1).

5. The magnetic linear drive as claimed in one of claims 1 to 4,
characterized in that
two yoke bodies (8, 9) are provided, which are opposite one another with respect to the movement path of the magnetically active part (3) and form airgaps (7) between them, through which at least part of the movement path of the magnetically active part (3) passes.

6. The magnetic linear drive as claimed in one of claims 1 to 5 having a control device,
characterized in that
a number of energy-storage capacitors (19), which can be charged and can be connected jointly or alternatively to a coil on a case-by-case basis, are provided in the control device (31, 32, 33).

7. A method for operating a magnetic linear drive as claimed in claim 1,
characterized in that

the coil (10, 11) in each case has a current passed through it in the same direction

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in order to drive the armature (1) in different directions.

8. The method as claimed in claim 7, characterized in that the passing of a current is ended before the magnetically active part (3) has reached its limit position.

9. The method as claimed in claim 8, characterized in that the current flow through the coil (10, 11) is interrupted as soon as the supply voltage changes its mathematical sign owing to an electrical oscillation process.

10. The method as claimed in claim 8, characterized in that the current flow is diverted to an energy-storage capacitor (19) as soon as the supply voltage changes its mathematical sign owing to an electrical oscillation process.

11. A method for operating a magnetic linear drive as claimed in claim 1, characterized in that first of all, a current is produced in the coil (10, 11), whose resultant magnetic flux in the coil (10, 11) is parallel to, but in the opposite direction to, any magnetization of the magnetically active part (3), provided this is magnetized, and in that, once the magnetically active part (3) has reached the location of the greatest magnetic field strength of the coil (10, 11) on its movement path, the current direction through the coil (10, 11) is reversed.

Translation of the PCT